

See "Instructions for Filling out the Work Permit" contained in the Work Planning and Control for Experiments and Operations Subject Area.

1. Work request WCC fills out this section.

☐ Standing Work Permit

Requester: Don Lynch	Date: 031912	Ext.: 2253	Dept/Div/Group: PO/PHENIX
Other Contact person (if different from requester): Carter Biggs			Ext.: 7515
Work Control Coordinator: Don Lynch		Start Date: 03/20/2012	Est. End Date: 03/23/2012
Brief Description of Work: Warm up VTX/FVTX Detector, remove test wedges, move to run position, Cool down detector			
Building: 1008	Room: IR	Equipment: VTX/FVTX	Service Provider: PHENIX Technicians

2. WCC, Requester/Designee, Service Provider, and ESS&H (as necessary) fill out this section or attach analysis

ESS&H ANALYSIS			
Radiation Concerns	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Activation	<input type="checkbox"/> Airborne
	<input type="checkbox"/> Contamination	<input type="checkbox"/> Radiation	<input type="checkbox"/> NORM
	<input type="checkbox"/> Other		
<input type="checkbox"/> Special nuclear materials involved, notify Isotope Special Materials Group			
<input type="checkbox"/> Fissionable/Radiological materials involved, notify Laboratory Nuclear Safety Officer			
Radiation Generating Devices:	<input type="checkbox"/> Radiography	<input type="checkbox"/> Moisture Density Gauges	<input type="checkbox"/> Soil Density Gauges
	<input type="checkbox"/> X-ray Equipment		
Safety and Security Concerns	<input type="checkbox"/> None	<input type="checkbox"/> Explosives	<input type="checkbox"/> Transport of Haz/Rad Material
	<input type="checkbox"/> Pressurized Systems	<input type="checkbox"/> Railroad Work	
<input type="checkbox"/> Adding/Removing Walls or Roofs	<input type="checkbox"/> Critical Lift	<input type="checkbox"/> Fumes/Mist/Dust*	<input type="checkbox"/> Magnetic Fields*
<input type="checkbox"/> Asbestos*	<input type="checkbox"/> Cryogenic	<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Nanomaterials/particles*
<input type="checkbox"/> Beryllium*	<input type="checkbox"/> Electrical	<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Noise*
<input type="checkbox"/> Biohazard*	<input checked="" type="checkbox"/> Elevated Work	<input type="checkbox"/> Lasers*	<input type="checkbox"/> Non-ionizing Radiation*
<input type="checkbox"/> Chemicals/Corrosives*	<input type="checkbox"/> Excavation	<input type="checkbox"/> Lead*	<input type="checkbox"/> Oxygen Deficiency*
<input type="checkbox"/> Confined Space*	<input type="checkbox"/> Ergonomics*	<input type="checkbox"/> Material Handling	<input type="checkbox"/> Penetrating Fire Walls
* Safety Health Rep. Review Required	<input type="checkbox"/> Haz, Rad, Bio Material Exceed DOE 151.1-C Levels - Contact OEM	<input type="checkbox"/> Other	
Environmental Concerns			
	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Work impacts Environmental Permit No.	
<input type="checkbox"/> Atmospheric Discharges (rad/non-rad)	<input type="checkbox"/> Land Use Institutional Controls	<input type="checkbox"/> Soil Activation/contamination	<input type="checkbox"/> Waste-Mixed
<input type="checkbox"/> Chemical or Rad Material Storage or Use	<input type="checkbox"/> Liquid Discharges	<input type="checkbox"/> Waste-Clean	<input type="checkbox"/> Waste-Radioactive
<input type="checkbox"/> Cesspools (UIC)	<input type="checkbox"/> Oil/PCB Management	<input type="checkbox"/> Waste-Hazardous	<input type="checkbox"/> Waste-Regulated Medical
<input type="checkbox"/> High water/power consumption	<input type="checkbox"/> Spill potential	<input type="checkbox"/> Waste-Industrial	<input type="checkbox"/> Underground Duct/Piping
Waste disposition by:	<input type="checkbox"/> Other		
Pollution Prevention (P2)/Waste Minimization Opportunity:	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	
FACILITY CONCERNS			
	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Intermittent Energy Release	
<input type="checkbox"/> Access/Egress Limitations	<input type="checkbox"/> Electrical Noise	<input type="checkbox"/> Potential to Cause a False Alarm	<input type="checkbox"/> Vibrations
	<input type="checkbox"/> Impacts Facility Use Agreement	<input type="checkbox"/> Temperature Change	<input type="checkbox"/> Other
<input type="checkbox"/> Configuration Management	<input type="checkbox"/> Maintenance Work on Ventilation Systems	<input type="checkbox"/> Utility Interruptions	
WORK CONTROLS			
Work Practices			
<input type="checkbox"/> None	<input type="checkbox"/> Exhaust Ventilation	<input checked="" type="checkbox"/> Lockout/Tagout	<input type="checkbox"/> Spill Containment
	<input type="checkbox"/> Security (see Instruction Sheet)	<input type="checkbox"/> Time Limitation	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Back-up Person/Watch	<input type="checkbox"/> HP Coverage	<input type="checkbox"/> Posting/Warning Signs	
<input type="checkbox"/> Barricades	<input type="checkbox"/> IH Survey	<input type="checkbox"/> Scaffolding-requires inspection	<input type="checkbox"/> Warning Alarm (i.e. "high level")
			<input type="checkbox"/> Electrical Inspection Required
Personal Protective Equipment			
<input type="checkbox"/> None	<input type="checkbox"/> Ear Plugs	<input type="checkbox"/> Gloves	<input type="checkbox"/> Lab Coat
	<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Respirator*	<input type="checkbox"/> Safety Harness
<input type="checkbox"/> Coveralls	<input type="checkbox"/> Ear Muffs	<input type="checkbox"/> Goggles	
<input type="checkbox"/> Disposable Clothing	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Hard Hat	<input type="checkbox"/> Shoe Covers
	<input checked="" type="checkbox"/> Safety Shoes	<input type="checkbox"/> High visibility cloths/vest	<input type="checkbox"/> Other
Permits Required (Permits must be valid when job is scheduled.)			
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Cutting/Welding	<input type="checkbox"/> Impair Fire Protection Systems	
<input type="checkbox"/> Concrete/Masonry Penetration	<input type="checkbox"/> Digging/Core Drilling	<input type="checkbox"/> Rad Work Permit-RWP No	
<input type="checkbox"/> Confined Space Entry	<input type="checkbox"/> Electrical Working Hot	<input type="checkbox"/> Other	
Dosimetry/Monitoring			
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Heat Stress Monitor	<input type="checkbox"/> Real Time Monitor	<input type="checkbox"/> TLD
<input type="checkbox"/> Air Effluent	<input type="checkbox"/> Noise Survey/Dosimeter	<input type="checkbox"/> Self-reading Pencil Dosimeter	<input type="checkbox"/> Waste Characterization
<input type="checkbox"/> Ground Water	<input type="checkbox"/> O ₂ /Combustible Gas	<input type="checkbox"/> Self-reading Digital Dosimeter	<input type="checkbox"/> Other
<input type="checkbox"/> Liquid Effluent	<input type="checkbox"/> Passive Vapor Monitor	<input type="checkbox"/> Sorbent Tube/Filter Pump	
Training Requirements (List specific training requirements)			
CA-Collider User, PHENIX Awareness, Working at heights			
Based on analysis above, the Review Team determines the risk, complexity, and coordination ratings below:		If using the permit when all hazard ratings are low, only the following need to sign: (Although allowed, there is no need to use back of form)	
ESS&H Risk Level:	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High	WCC:	Date:
Complexity Level:	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High	Service Provider:	Date:
Work Coordination:	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High	Authorization to start	Date:
(Department/Division, or their equivalent, Sup/WCC/Designee)			

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

Work Plan (procedures, timing, equipment, scheduling, coordination, notifications, and personnel availability need to be addressed in adequate detail):
See attached work plan

Special Working Conditions Required (e.g., Industrial Hygiene hold points or other monitoring)
None

Notifications to operations and Operational Limits Requirements: None

Post Work Testing, Notification or Documentation Required: No

Job Safety Analysis Required: ☐ Yes ☒ No

Review Done: ☐ in series ☐ team

Reviewed by: * Primary Reviewer signature means that the Review Team members were appropriate for the work that was planned, the Team visited the job site, hazards and risks that could impact ESS&H have been considered and controls established according to BNL requirements. In addition, this signature indicates that applicable JRAs, FRAs, as well as other planning documents have been reviewed and training requirements have been identified and recorded on this permit.

Title	Name (print)	Signature	Life #	Date
ES&H Professional				
F&O Facility Project Manager				
Service Provider				
Work Control Coordinator	Don Lynch		20146	
Safety Health Representative				
Research Space Manager				
Other				
Other				
Required Walkdown Completed				
*Primary Reviewer				

4. Job site personnel (Supervisor and workers) fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments) and all training required for this permit is current/complete. Job Supervisor/Contractor Supervisor signatures also includes verification that worker training required for this permit is current/complete.

Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:

Workers are encouraged to provide feedback on ESS&H concerns or on ideas for improved job work flow. Use feedback form or space below.

5. Department/Division, or their equivalent, Line Manager or Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)

Name:	Signature:	Life#:	Date:
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6. Worker provides feedback.

Worker Feedback (use attached sheets as necessary)

a) WCM/WCC: Are there any changes as a result of worker feedback? ☐ Yes ☐ No

Note: See Work Planning and Control for Experiments and Operations Subject Area section 2.6.

7. Post Job Review/Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of job site to work supervisor.) The WCC ensures that the change process to update drawings, placards, postings, procedures, etc., is initiated, if necessary.

Name:	Signature:	Life#:	Date:
Comments:			

FVTX & VTX Moving Detectors into Run Position After Maintenance & Test**Introduction**

This procedure is prepared to document the steps necessary to move the VTX/FVTX detector subsystem assembly into run position tightly closed about the PHENIX beampipe, from its temporary installed position with its halves opened approximately 10 inches to the east and west sides, respectively. The subsystem was moved to this position to perform maintenance and troubleshooting between the run 12 200 GeV and 500 GeV and left in this position while the run 12 500 GeV beam is being conditioned/stabilized.

In addition, the test wedges (installed for radiation sensitivity testing when the detector halves were separated for maintenance between the 200 and 500 GeV runs, see WP# DRL-2012-8) are to be removed for analyses.

Procedure

NOTE: all work is to be performed only by appropriately trained PHENIX technicians.

A) The following is the procedure we should followed to warm up the system.

- 1) At ~6 AM confirm with the Shift Crew that the VTX/FVTX systems are off.
- 2) Once confirmed, set chiller -3C to 1C (chiller one is on the left closest to the shield wall. It is labeled). It is currently set to -3C. It should be left there for an 30 minutes to warm up on its own.
- 3) After 30 minutes (~6:30am), the set-point of chiller 1 should be set to 4C. This 4C increase should be repeated every 30 minutes until the temperature is 12C. (7:00 am – 8C, 7:30 am - 12 C) Chiller should be above 10 C after about 1 hr 45 min.
- 4) At ~8am, the plug door will open.
- 5) Before the covers are removed from the FVTX/VTX halves, the temp of the system should be confirmed to be at 10C and the IR DEW point is below 10 C.
- 6) Also before removing the covers, the FVTX test wedges mounted as described in PHENIX WP # DRL-2012-8 shall be removed and given to the FVTX experts for analyses.
- 6) Once detector is ready to be moved, the chiller set-points should be set to 20C. Once this is done, the power to the chillers (both 1 and 2) should be turned OFF. This will drop the pressure in the system to zero. Changing the set-point to 20C before turning off is done so that when the chillers are powered back on, the compressors do not try to cool the fluid right away.

B) Remove the covers and PHENIX carefully close the 2 halves to their run position tightly around the beampipe, taking care to avoid any contact with detector surfaces and to completely seal the detector. This is worker planned work to be performed only by PHENIX technicians approved by PHENIX engineering.

C) Once the halves are together and the system is ready to flow Novec, the follow steps should be followed to turn the cooling system back ON:

1) Put the system into Bypass. To do this, open the bypass valve first, then close the feed and return valves slowly.

2) Once in bypass, turn the chiller back on and note the temp of both systems. Set the set-point of the chillers to that temperature. This way the system is only circulating fluid and not cooling it.

The next step is to pressurize the detector and look for any new leaks that may have developed. There are 4 loops in the cooling system:

*VTX/FVTX North, VTX/FVTX South, Big Wheel North, Big Wheel South.
(note, the VTX pixels are on the Big Wheel loops)*

3) To test a loop, open one of the feed valves slowly to pressurize one of the manifolds. Note, the bypass valves should still be open. Check the manifold for leaks. At the same time, carefully look at the detector for leaks. If that loop is fine, open both the feed valve and return valve completely then close the bypass valve slowly.

4-6) Repeat step3 for the other 3 loops.

7) Once all 4 loops are running recheck the connections for leaks since the systems pressure will double once all the bypass valves are closed.

One thing to note, the detector should be closed and flowing N2 for at least an hour before bringing chiller 1 temp below 10C.

8) Once all loops are pressurized and test to be fine, the systems can start to be cooled. The set-points of the chillers can be dropped by ~4C per 30 min until chiller 1 is at -3C and Chiller 2 is at 10C.

9) Once at operating temps, the manifolds and detector should be checked for leaks again in case something happened during the temperature cycle. The connections inside of chiller 1 and chiller 2 should also be inspected to make sure no leaks have developed again.

10) Final step is to make note in the chiller log book of the levels of the Novec so that losses can be monitored overnight.

After completing the above, note any difficulties or “lessons learned” on the work permit accompanying this procedure..